

We cannot, however, equally praise the system of including American and other stragglers as European birds. It needlessly encumbers an already very bulky work, and leads to misconception, and it will also have the effect of making the book apparently imperfect whenever fresh stragglers reach our shores. Is it not absurd in a book of European birds to have seven pages devoted to the American Stint, with full details of its distribution over North America, and the statement that it has occurred "twice in Britain" as the sole justification for including it? Another seven pages is devoted to the American Hawk Owl on the strength of its occurrence four times in Britain. Such birds should be rigidly excluded from the body of the work, and only described in notes or an appendix when it is necessary to do so in order to avoid confusion with the allied European species.

It is a pity that the temporary paging of the letterpress to each species had not been altogether omitted, as it is of no use whatever, and occupies the prominent position which should have been left for the permanent paging. As the only means of remedying the evil, we would suggest that when the work is completed a series of numbers be printed in squares reaching to the highest number of pages in a volume, and be issued with the last part on gummed paper, so as to be cut out and fastened in the proper position over the temporary numbers.

The figures by Mr. Keulemans continue to be as spirited and lifelike as ever, and the authors devote the same attention as heretofore to giving the fullest and most reliable information obtainable. The work will thus satisfy the requirements both of the scientific naturalist and of the general reader and amateur. The former requires accurate descriptions and figures, careful measurements, and precise indications of distribution and habits. The latter wants to determine readily any bird he may meet with at home or on the Continent, with an intelligible and interesting account of its habits and distribution, and other topics of general interest. To both these classes of readers we can cordially recommend this book, and we believe that it is calculated at once to take a high position as a scientific work, and at the same time to popularise the delightful branch of natural history of which it treats.

A. R. W.

GEOMETRICAL CONIC SECTIONS

Geometrical Conic Sections: an Elementary Treatise, in which the Conic Sections are defined as the Plane Sections of a Cone, and treated by the Method of Projections. By J. Stewart Jackson, M.A. (Macmillan and Co., 1872.)

The Geometry of Conics. Part I. By C. Taylor, M.A. (Deighton, Bell, and Co., 1872.)

MR. TAYLOR'S present work is by no means a second edition of his "Geometrical Conics" (1863). His object in this volume is a highly laudable one; from more than one quarter has recently come the complaint that the subject of geometrical conic sections is in an unsatisfactory state. The work under consideration is stated to be "the result of an attempt to reduce the chaos of geometrical conics to order, the subject having suffered not a little from desultory treatment." As in the earlier treatise, our author does not define the conics in question

to be sections of a cone; and here he is at direct issue with Mr. Jackson:—"I am unable, despite his skilful advocacy, to acquiesce in the primary definition of conics from the solid."

This feud among writers on the conic sections is of old date. Simson, in his preface, stated that Wallis (1655) treated of these curves not as being sections of a solid (*nulla coni habita ratione*), and that he was followed by De Witt and De la Hire. T. Newton, in his "Treatise" (1794), remarks that in the University of Cambridge the preference seems to have been given to that method which begins with a description of the curves *in plano*; whereas in the sister University, the Savilian professor, Abram Robertson, in a nearly contemporary work (1802), adopts the more ancient definition, and bases on it a very interesting exposition of the principal properties of conics. This latter method is the one we are inclined to prefer in a school book, though it is not that adopted by our standard writers, as Drew, Besant, and Taylor. Mr. Wilson, we were glad to see, has adopted it in his very handy though concise introduction to the study of these curves.

Putting on one side the numerous typographical errors in Mr. Jackson's work, and some few inelegancies, as we think, in the proofs—the results, doubtless, of too great haste in bringing it out—we have much pleasure in commending this volume, and hope that he will soon have an opportunity of removing these slight blemishes. If he has this opportunity, we are sure it will not be the result of luck ("in case this work should be so fortunate as to reach a second edition"), but the reward of genuine merit.

It is hardly needful to enter into any details respecting Mr. Taylor's mode of treatment of his subject. He is too well known and approved a writer upon it to need our commendation. Suffice it to say that many waifs and strays which he has previously communicated to the mathematical journals here find a fitting place. His leading principle, and that which tends so much to the clearness of his exposition, is that "Chord properties should take precedence of the Tangent properties, the latter being deduced from the former and not the former from the latter." A noteworthy feature is the prominence assigned to the treatment of a curve usually hurriedly passed over—the rectangular hyperbola. To this curve he devotes pp. 61—77. He very fully acknowledges his indebtedness to Prof. Wolstenholme's investigations of the properties of the curve. He has himself elsewhere (*Messenger of Mathematics*, vol. i. pp. 121—127) treated of the curve in question.

The book is a valuable contribution to the literature of this branch of pure geometry; and though it may not take the place of Besant's fuller treatise, as it does not go over the same extent of ground, yet it is worthy of being ranked side by side with it. We shall hail with pleasure the remaining part or parts of the work.

OUR BOOK SHELF

An Introduction to the Practical and Theoretical Study of Nautical Surveying. By J. K. Laughton, M.A. (London: Longmans and Co., 1872.)

THIS work is intended to supply a want that has long been felt by young officers of the navy who have not had an opportunity of gaining a knowledge of the methods of conducting a coast survey used on board vessels regu-

larly employed on such work. We are accustomed to quote with pride the old saying, that wherever wood would float an English pendant was to be seen, and it is true at the present time, that every sea, well known or slightly known, is visited more or less frequently by our men-of-war. But unfortunately many of these places are roughly surveyed, the coast lines inaccurately laid down, and the positions of the principal dangers doubtful. Here much valuable work can be done by those not surveyors, who have time and are willing to take the opportunities often given them, to improve our knowledge by making a correct survey or verifying the charts of the coasts they may visit. To these Mr. Laughton's book will be exceedingly valuable, and though in his introductory chapter the author modestly says that he writes "not for the guidance of surveyors, but for those who know little or nothing at all about it," we are sure that many old surveyors will find their work easier from having the principles so clearly brought before them. The work is the more valuable in showing what can be done with the means at hand on board every vessel, though not especially equipped for the work. The second chapter describes the choice and measurement of the base line, and the methods for determining the exact latitude and longitude of the first position. The rules given are exceedingly clear and simple, and can be readily followed by anyone in the habit of using the sextant and artificial horizon. The hints on the choice and adjustment of the sextant will be found very useful to every navigator. Mr. Laughton's practical way of dealing with the subject is shown in his suggestion to get an old sextant and let it fall on the deck in order to acquire a thorough acquaintance with its mechanism in putting it to rights again. But it is a pity that the description of the instruments should be placed between the rules for the choice and measurement of the base line, indeed it would be better if this chapter were re-arranged. A great deal more might be said on the selection of objects for triangulation, this is a point on which the beginner encounters his greatest difficulty; some hints also as to the best way of noting angles would be useful, this want is supplied when levelling is treated of. Chapter III. is devoted to the construction of charts and various projections of the sphere, it is very clear and concise, and will prove valuable not only to the chart-maker, but also to the navigator, who will here gain a clearer knowledge of the plan on which the chart he uses is laid down, than is to be found in most books on navigation. We recommend, especially to young surveyors, the method advocated for graduation of charts according to the gnomonic projection, it is more comprehensive and certainly more mathematically correct than the methods usually employed, and we do not remember to have met it described in any other work. The part of Chapter IV. relating to the determination of positions is perplexing, and would with difficulty be understood by an inexperienced surveyor, without examples. The author might have well supplemented this part by showing graphically the way of protracting the angles, and finding the points of intersection. It is not clear why he has omitted from the description of instruments all mention of the protractor, an instrument as essential to the surveyor and navigator as his pair of compasses. The remarks in the last few pages on the "danger angle," or as it was called by old surveyors the "approximative angle," will be found very useful by all navigators, especially those who since the introduction of iron ships have experienced the difficulty and uncertainty of determining positions quickly by the compass when the course is changing rapidly. The running survey is ably treated, but we regret there is no illustration of the mode of surveying a harbour; this is a serious omission, but notwithstanding this, and the want of illustration of the choice of stations and selection of objects, we can recommend the book as the best out on the subject.

The Lepidopterist's Guide, intended for the Use of the Young Collector. By H. Guard Knaggs, M.D., F.L.S. Second Edition, illustrated. (London: Van Voorst.)

THE want of such a "Guide" as the present was long felt by "young collectors" before the appearance of this book; but now this want is so well supplied that a second edition has not only been issued, but nearly exhausted, and we call attention to it with confidence, because, although eminently popular in its style and treatment, it is the work of a practical hand, and is as reliable as it is full and complete. In these days of cheap books it is marvellously cheap, and we are led to wonder how a scientific manual of upwards of 120 pages, closely printed, and copiously illustrated, can be produced for one shilling. Everything that the young collector is likely to require information upon will be found by a little searching, which a copious index would greatly facilitate, and which we hope to see appended to a future edition. We have no doubt this Guide will continue to receive the support it so well deserves. C.

LETTERS TO THE EDITOR

[The Editor does not hold himself responsible for opinions expressed by his correspondents. No notice is taken of anonymous communications.]

The Variation in Outline of American "Flint" Arrow-heads

I FIND, after a careful perusal of the sixteenth chapter of Mr. Evans's magnificent work on British Stone Implements—on javelin and arrow-heads—that he has considered the American forms far more uniform, less varied in outline than they really are. I am familiar with many collections made at distant parts of the Union, and have an immense assortment of my own collecting now in the Museum of the Peabody Academy, at Salem, Mass. In these several collections is every form that Mr. Evans has figured, and several that he has not mentioned.

On page 362 of Mr. Evans's work, I find the author asserting as a prevailing type, "that with a notch at the base on either side." While this form unquestionably is very common, it cannot be considered as the "prevailing" one, inasmuch as several distinct patterns equal it in numbers found, and some exceed it, as those that "have merely a central tang, with little or no attempt at barbs." A second statement of Mr. Evans strikes me as very remarkable. He says, "the leaf-shaped form is very rare." This is a very great error. In any locality where arrow-points are to be found at all, they are always to be met with; and I have gathered scores of them that for symmetry far excel any of the figures given by Mr. Evans.

Nor can I admit the correctness of Mr. Evans's assertion concerning arrow-points, that "for the most part the chipping is but rough, as the material, which is usually chert, hornstone, or even quartz, does not readily lend itself to fine work." I believe no arrow-points have ever been discovered that can exceed, in beauty of finish, those I have myself gathered from the fields and meadows of central New Jersey. And I am the more surprised at Mr. Evans's remarks, inasmuch as the specimens I have found, that have been wrought from white or rose quartz, are remarkable for the smooth surfaces and sharp edges they present. So, too, of our jasper and hornstone specimens. Remarkably diversified in form, uniformly well finished, they strike the beholder with astonishment, when the "intractability" of the material is recognised. I have seen but few specimens of arrow-points not found in the United States; but judging from them and the illustrations of Mr. Evans's work, I unhesitatingly assert, that although we have no convenient flint in New Jersey or near it—Prof. T. A. Conrad has discovered true flint and chalk in Colorado—we have, in the jasper, chert, hornstone, quartz, and slate arrow-heads, examples of such weapons, as are in no wise inferior to those of Europe in beauty of finish, or less diversified in the various so-called "types."

Mr. Evans seems to have based most of his impressions concerning our antiquities upon Schoolcroft's ponderous tomes, which present little or nothing of value, of our "antiquities," whatever may be their reliability as concerning the "Indians," at the time when the volumes were compiled.